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FOREST INSECT SURVEY - SEQUOIA NATIONAL FOREST

SEASON OF 1945

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Forest Insect Laboratory
Berkeley 4, California
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U. S. Department of Agriculture
Bureau of Entomology and Plant Quarantine
Forest Insect Investigations

FOREST INSECT SURVEY - SEQUOIA NATIONAL FOREST
SEASON OF 1945

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October 12, 1945

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FOREST INSECT SURVEY - SEQUOIA NATIONAL FOREST
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I. CONDITIONS OF THE 1945 SURVEY AND THE AREAS COVERED.

In September 1943 a general survey of forest insect conditions on the Sequoia National Forest was made and reported upon by John E. Patterson of the Berkeley laboratory of the Bureau of Entomology and Plant Quarantine. This was primarily a reconnaissance of the commercial pine types and the back areas of the Forest were not examined.

In 1944 a general survey of the Forest was not attempted by the Berkeley laboratory because of limited personnel under the war emergency and no report was made for that season.

In 1945 the Berkeley laboratory made the attempt to close up this gap in the records, but was able to assign only one man for a few days to the project. This examination, however, was facilitated by assistance from the Forest Service personnel of the Sequoia, particularly by Don Lewis who spent two days with the writer on examinations of areas in the Kings River and Tule River districts on August 28 and 29. Later in September in connection with a survey of the Sequoia and Kings Canyon National Parks, a total of about one more day was spent in checking conditions in the Mineral King and Goat Corral Burn areas.

The areas covered by the 1945 survey were located in the pine type of the western watersheds of the Forest, and the information obtained was mainly of an observational character. Loss measurements were limited to two road strips covering about 240 acres located in the Dunlap and Camp Nelson areas. Extensive counts of recently killed trees were used as a basis for appraisal of bark beetle infestations within the Pinehurst, Hume Basin, Camp Nelson, Peppermint Creek and Lloyd Meadows areas. Attention was also given to special entomological problems involved in the experimental thinning plots near Hume, the Mineral King Recreational area and the Goat Corral Burn.

II. GENERAL STATUS OF BARK BEETLE INFESTATIONS FOR THE 1945 SEASON.

At the time that the field examinations were made only the 1945 summer brood trees were in evidence in ponderosa and sugar pine. These provided only an indication of the trends for the 1945 season. None of the overwintering brood trees had faded as the attacks of this generation of beetles were just beginning in early September. However, it was fairly apparent that bark beetle infestations in the ponderosa-sugar pine types are generally endemic for this season. This applies to all of the areas that were viewed with the exception of a zone just south of the Goat Corral Burn

which will be discussed later. The general run of the 1945 losses in the commercial pine types were estimated to be less than 10 trees per section or 15 board feet per acre. This is well below the point requiring control action.

Very few lodgepole pine areas were included in the survey. A spot center of mountain pine beetle infestation was noted as definitely increasing at Holby Meadows, but this cannot be considered as indicative of conditions elsewhere in the lodgepole type.

In white fir stands the damage caused by Scolytus appeared to be on the increase, but is well below the epidemic condition which was prevalent some 10 to 15 years ago. For a more detailed description of the 1945 conditions, the individual areas included in the survey will be discussed separately.

III. THE CONDITIONS BY AREAS

1. Camp Nelson

The roadstrip between Osa and McIntyre Creeks (Rd. 1, 2.4 miles, 100 acres) was run on August 29 and yielded only one insect-killed tree. This was a small 1944 winter tree killed by flatheads. In a visual spotting of the Camp Nelson unit of 16,000 acres from viewpoints on the road to Aspen and Holby Meadows, the following trees were counted:

	<u>1944 Winter</u>	<u>1945 Summer</u>
Ponderosa pine	5 trees	3 trees, 2 poles
Sugar pine	2 trees	2 trees
Total	7 trees	5 trees

The total 1945 loss within the unit will probably not exceed 65 trees or less than 5 per section. This is less than any seasonal loss previously reported. The only concern over present conditions can arise only if a tree happens to be killed on a valuable summer home site.

2. Holby Meadows

A limited group infestation of mountain pine beetle in lodgepole was reported here in 1937, but this apparently died down about 1941. This year the beetles were found to be active again, but this time in a new center in the more southern part of the meadows. One group of 4 trees killed by the beetles in 1941 was spotted and upon close examination 15 freshly attacked trees of the 1945 season were found in the immediate vicinity. This indicates an aggressive infestation, but it is confined to the lodgepole and does not present a threat to the adjacent stands of ponderosa and Jeffrey pine. Since the meadow type of lodgepole pine is not extensive and grazing values predominate on these sites, control may not be necessary.

3. Upper Peppermint Creek

A road count was made in the ponderosa-Jeffrey pine type from Holby Meadows to Dome Rock and an extensive count from Dome Rock indicated that the 1945 loss in this area will not average over 5 trees per section.

4. Lloyd Meadows

A view of this area was secured from the Needles Lookout which was too distant for accurate counting. It was apparent that some loss was going on in the Jeffrey pine, but there was no indication that it was above the endemic status.

5. Ten Mile Creek and Hume Basin

A road count from Quail Flat to Hume recorded only 1 recently killed ponderosa pine. Two 1945 sugar pines were spotted on the north side of Park ridge, but this infestation is far below that observed in the same area from 1937-1940.

The only unusual conditions noted in the Hume area were at Larsen's resort. Here three 1944 winter brood ponderosa pines had been killed in the park area in front of the lodge and two 1945 summer trees had developed in the same group. Two sugar pines on the same site were slowly dying. This center has apparently been induced by oiling of the parking areas and packing of the soil by intensive use. On the westside of the lake a group of 12 small ponderosa pines died last year and were infested only by flatheads. Stumps of trees which had been cut down near this group indicated that a similar loss had been going on for some time. These trees are all so close to the water line of the lake that it can be assumed that flooding of the root systems is responsible for the trouble. There is no evidence of aggressive bark beetle infestations in the pine area to account for a local group killing of this character.

6. Dunlap and McKenzie Ridge areas

South of Dunlap and Pinehurst the 1945 infestation in the pine stands has maintained the same level found elsewhere in the Forest; but north of Dunlap along the western flanks of McKenzie Ridge there has been a definite increase this year. The roadstrip between the 5,000 and 6,000 foot contours on the new Grant Park highway (Rd. 3, 3.3 miles, 135 acres) yielded the following tally:

	<u>1944 Winter</u>	<u>1945 Summer</u>
Ponderosa pine	2 trees	6 trees
Sugar pine	1 tree	4 trees
Total	3 trees	10 trees

This strip indicates an annual infestation of around 60 trees per section with a rapidly increasing trend. It was apparent, however, that this condition is localized and it is believed to be the result of a spread of beetles during the summer of 1945 from the Goat Corral Burn which is located 2 to 3 miles north of the strip.

7. Goat Corral Burn

This fire occurred on September 22, 1943, and burned over 5,000 acres, killing 5 million feet of ponderosa pine. Dr. Wagener of Forest Pathology established a survey study plot of fire-injured trees, but no examination for beetle infestations was made until the survey of this year. On September 2 the writer noted increasing infestations around the southern borders of the burn and on September 26 made a trip to the Delilah Lookout when good views of the burned area were obtained.

This seems to have been a type of fire in which many ponderosa pines survived the immediate effects of fire injury, but suffered a varying degree of crown defoliation due to scorching. Such conditions usually invite a concentration of bark beetle attacks in the surviving fire-injured trees during the first and second seasons following the fire. Studies of similar burns have shown that by the end of the second season all of the susceptible trees will have been killed, and the infestation has then died down within the burn. In some cases the momentum of the infestation has carried out into the surrounding unburned territory after the supply of fire-injured trees has become exhausted. This has happened to a limited extent around the Goat Corral Burn.

Usually when bark beetles spread from heavy concentrations of populations new group attacks may suddenly appear within a zone of 1 to 6 miles from the point where the beetles take flight. The first spread from the Goat Corral centers was made largely by the 1945 summer generation of beetles and has resulted in some group attacks of 3 to 4 trees each at varying distances from the Burn. These small groups and occasional single trees are widely spaced and do not seem to constitute a serious epidemic threat in the general area. Most of the pine type where this new infestation is appearing is either old cutover or marginal virgin stands in which most of the overmature beetle-susceptible trees were killed by the epidemic of 1929-32.

It was estimated that within the Burn and along its borders there were between 500 and 1,000 summer brood trees, all of which will be abandoned by the fall of 1945. If the beetles emerging from these summer trees succeed in establishing strong attacks of the 1945 overwintering generation in timber outside of the burn, then there is a good chance that heavy losses will continue in 1946 and control should be considered. If this overwintering attack does not materialize, then the infestation can be expected to die down next year within the Burn and the surrounding area.

IV. BARK BEETLE INFESTATIONS ON THE PONDEROSA PINE THINNING PLOTS

In March 1945 Mr. Lewis reported to the Berkeley laboratory that Ips outbreaks had occurred on test plots established last season in the Kings River district. Two of these plots in reproduction on the Dry Creek Burn of 1927 were examined August 28, 1945. A comparison of these two small

plots indicates that the amount of bark beetle infestation to be expected after thinning operations is related to the age of stand and the time of year when the cutting is done.

Comparison of thinning plots - Dry Creek Burn.

	<u>Plot No. 1</u>	<u>Plot No. 2</u>
Date of examination:	August 28, 1945	August 28, 1945
Date of thinning:	Late summer or fall of 1944; probably early October.	July 31, 1944
Age of stand:	Small saplings; 3-4 inch base diameter.	Mostly poles; 6-8 inches base diam.
Character of slash left on ground:	Small saplings spread under leave trees without creating dense piles.	Ground covered with tops, limbs and well shaded trunks of large size poles.
Subsequent bark beetle attack:	None found in either slash or leave trees.	Both Ips and <u>D.b.</u> attacks, now abandoned, on main trunks of cut trees. Ips attacked and killed a number of leave trees in late summer of 1944. No attacks in 1945.

These results bear out previous studies of the Forest Insect Laboratory which indicate that slash material cut during the late summer and fall is much less liable to Ips infestation than slash created in the spring and early summer. However, in this particular case it is believed that the size of the slash and the shaded condition in which it was left was equally as important as the time of cutting in inducing the bark beetle infestation on Plot 2.

Another sample of what can be expected on thinning operations was found at the McKenzie Guard Station when the writer contacted Forest Guard Cunningham on September 2.

In the spring of 1944 a group of 18 pole-sized ponderosa pines infested by overwintering broods of Ips were located about 5 chains southwest of the Station. These were cut and piled, but were not burned because of the fire hazard so the broods were not destroyed. The latter part of July 1944 a stand of poles and small trees north and east of the Guard Station was heavily thinned. This was a small experimental plot. By late fall most of the leave trees on this plot had been attacked by Ips confusus. The total 1944 overwintering infestation on this plot amounted to 16 trees of

large pole size of which 3 or 4 were only topkilled. The broods emerged from these trees in the spring of 1945, but no new leveloped around the site during the summer. Mr. Cunningham was cutting the abandoned trees in order to clean up the area around the Guard Station.

North of the Guard Station another plot was thinned during the summer or fall of 1944 (date uncertain). This was in a mixed pole stand of ponderosa pine and incense cedar. Although this plot was heavily thinned and a considerable amount of shaded pole material was left on the ground, no Ips attacks developed. Possibly this cutting was done late enough in the season to avoid an infestation, but other factors are undoubtedly involved.

V. THE NEEDLEMINER INFESTATION AT MINERAL KING.

Mineral King was visited on August 30 to check up on insect conditions in the small tract of lodgepole pine type which makes up the principal tree cover on the cabin sites. This area is of entomological interest because of an isolated infestation of the lodgepole pine needleminer which is known to have been prevalent in these trees for many years.

The infestation was first reported by Forest Supervisor Cunningham in 1923, who sent in specimens which were determined as Recurvaria milleri. This species has a 2-year life cycle with the flight of the moths occurring on the odd years (1941, 1943, 1945) and the larval feeding occurring on the even years. At the time that Mr. Cunningham reported the infestation there was a heavy flight of moths. Many trees in the area were then suffering from heavy previous defoliations, but none of them had died. The writer examined the area in 1932 and found the infestation still epidemic but no mortality of trees had resulted from the effects of defoliation. A study of suppressed ring growth in selected trees indicated that severe defoliations had occurred during the periods from 1901-07, 1913-15, 1921-26, and 1929-32. Survival of the heavily defoliated trees was attributed to the absence of any mountain pine beetle infestation in the Mineral King area. In other Sierra areas where the needleminer has occurred, mountain pine beetle infestations have invaded the defoliated stands and caused widespread killing of lodgepole pine. It was assumed that the isolation of the lodgepole type at Mineral King, which is separated by some miles from any other body of the same type, accounted for the fact that the beetle had not followed the needleminer into this area.

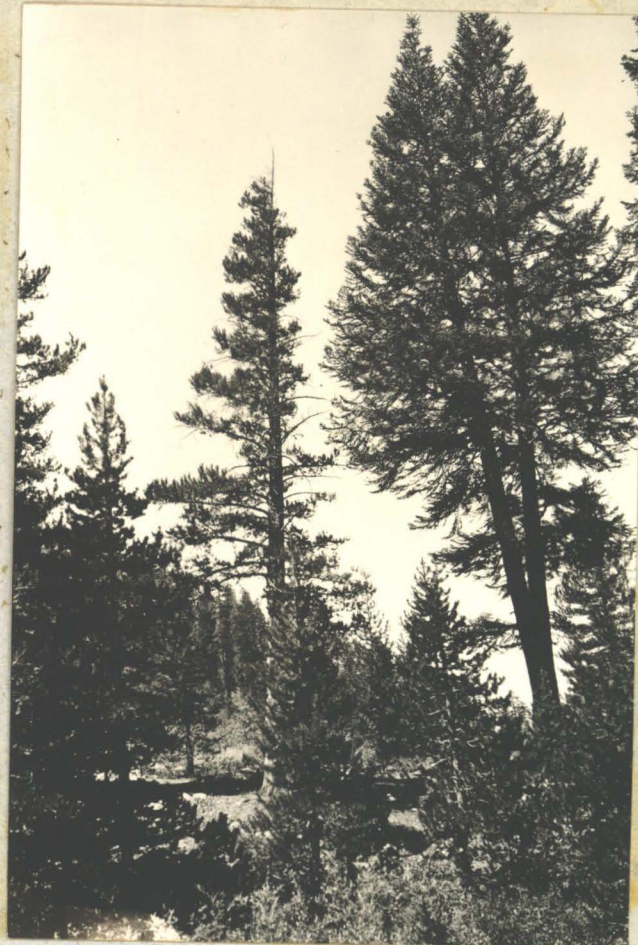
In 1938 S. T. Carlson of the Berkeley laboratory examined the area and found that the needleminer was still epidemic. The effects of the defoliation had advanced to the stage where the terminals and branches had been killed on many trees. For the first time the mountain pine beetle was found in the Mineral King area and was reported by Carlson to be attacking a few of the weakened trees. No subsequent examinations were made by the Berkeley laboratory and no reports on conditions are available for the 6-year period between 1938 and the recent examination of August 30.

In this recent survey no trace was found of any current infestation of the needleminer. If the infestation was still active, there should have been flight of moths during the summer of 1945 and an abundance of mined needles caused by the larval feeding during 1944; but no evidence of either was found. The indications are that the trees have not been attacked for several years past. Neither was there any evidence of recent mountain pine beetle infestation. Two dead trees were found which had been attacked by the beetle about 3 or 4 years ago, but no recent attacks could be located anywhere in the area. The control of both insects by undetermined natural factors seems to have been quite effective.

Some of the lodgepole trees still show the effect of old defoliations in the crowns. Photographs attached to this report illustrate conditions as they were found in August 1945.



Negative No. 13221c



Negative No. 13221c

LODGEPOLE PINE TYPE AT MINERAL KING ILLUSTRATING AFTER EFFECTS OF
DEFOLIATIONS BY THE LODGEPOLE NEEDLEMINER. August 30, 1945

In 1938 these trees were found to be heavily defoliated by a needle-miner infestation which had been in progress for some years. Later it was found that the infestation had died down sometime between 1938 and 1944. The trees are now recovering; but dead tops, dead twigs and limbs and thin crowns are hold-over injuries left by the old defoliations.



Negative No. 13221a

LODGEPOLE PINE TYPE AT MINERAL KING
August 30, 1945

In each of these photos there is one dead tree which was killed by the mountain pine beetle several years back. No further bark beetle attacks have developed in this area. The living trees are recovering from the effects of old defoliations by the lodgepole needleminer.

The upper picture (13221a) illustrates the isolation of this small area of lodgepole type to the north and east. The lodgepole is separated from fir type in the distance by open areas.



Negative No. 13221d